1.6 Graphical Transformations

Obj: 1. Algebraically & graphically represent translations, reflections, stretches & shrinks of fncs.

$f(x)=x^2$

Inside:	$g(x)=(x+2)^2$	horizontal
Outside:	$h(x)=x^2+2$	vertical

Addition/Subtraction:
translation

Multiplication | Division
stretch or compression
shrink

Negative
reflection

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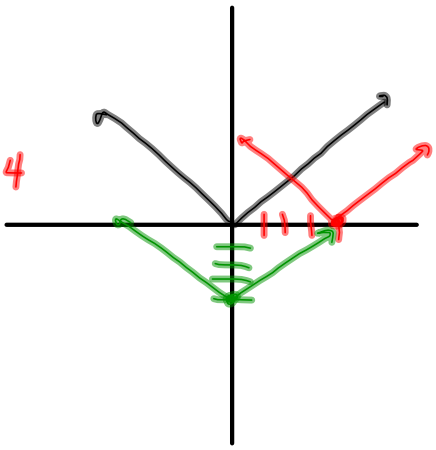
$y=|x|$

$y=|x-4|$ h. trans. right 4

$y=|x|-4$

v. trans. down 4



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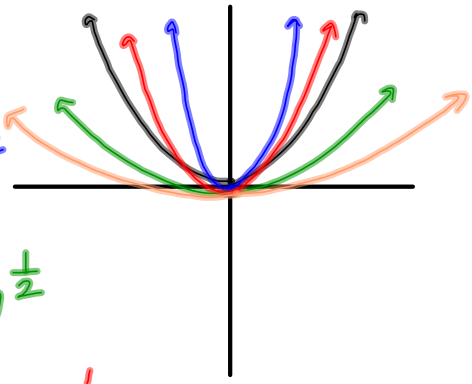
$f(x) = x^2$

$g(x) = 2x^2$ v. str. by 2

$h(x) = \frac{1}{2}x^2$ v. comp by $\frac{1}{2}$

$j(x) = (3x)^2$ h. comp by $\frac{1}{3}$

$k(x) = (\frac{1}{3}x)^2$ h. str. by 3



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Stretches / Compressions:

Horizontal: if $c > 1$: compression by $\frac{1}{c}$

ex: $(3x)^2$

If $c < 1$: stretch by $\frac{1}{c}$

ex: $(\frac{1}{2}x)^2$

ex: $(\frac{1}{3}x)^2$ h. comp. by $\frac{1}{3}$

rep. $\frac{1}{c}$

Vertical: If $c > 1$: stretch

ex: $4x^2$

If $c < 1$: compression

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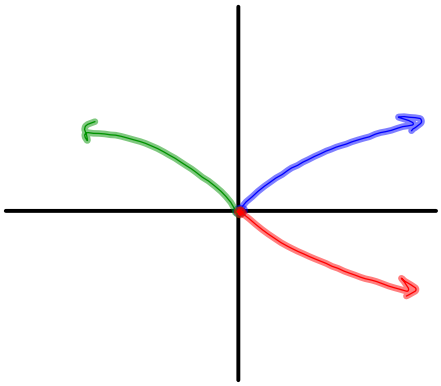
Reflections

$f(x) = \sqrt{x}$

$g(x) = \sqrt{-x}$ horiz. refl. over y-axis

$h(x) = -\sqrt{x}$ vert. refl. over x-axis



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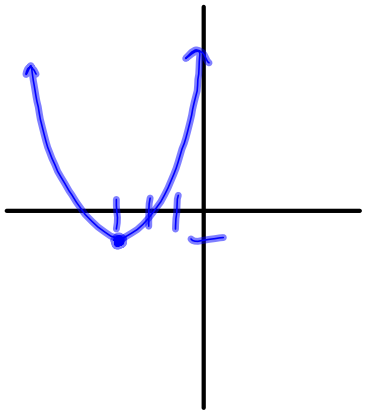
$f(x) = x^2$

$g(x) = (2x+6)^2 - 1$ down 1

h. comp by $\frac{1}{2}$

$[2(x+3)]^2 - 1$

left 3



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$f(x) = |x|$

$g(x) = \left|\frac{1}{2}x - 2\right| + 3$ h. str. by 2 right 4 up 3

$\left|\frac{1}{2}(x-4)\right| + 3$

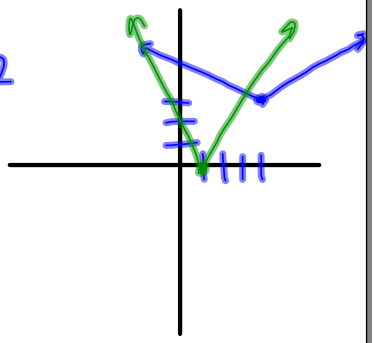
$h(x) = 3\left|-1x + 1\right|$

v. str. by 3

$3\left|-1(x-1)\right|$

refl. over y axis

right one



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